Racial/Ethnic Variation in Functional and Self-Reported Health

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Objectives. We investigated whether racial/ethnic health disparities exist in Canada and whether socioeconomic or behavioral differences between racial/ethnic minorities and nonminorities account for such disparities.

Methods. We used data from the National Population Health Survey, conducted by Statistics Canada in 1996 and 1997. We used regression models to examine differences in functional and self-reported health.

Results. Our study found no association between socioeconomic or behavioral differences and racial/ethnic health disparities. There was no clear pattern between racial/ethnic minority status and health.

Conclusions. The state can play an important role in health outcomes, and public commitment to accessible health care may explain why socioeconomic status and health behaviors are weak indicators of racial/ethnic health variation in Canada. (*Am J Public Health.* 2005;95:710–716. doi:10.2105/AJPH.2003.027110)

An inevitable effect of racial/ethnic stratification is inequality throughout many domains, including health risks and outcomes. Over the past several decades, epidemiologists and sociologists have conducted numerous studies that illustrate patterned disparities in the prevalence of health problems among racial/ethnic groups.[1–7] Previous research, primarily focused on Black–White comparisons, has shown that racial/ethnic minorities often experience more health problems than nonminorities. For example, studies of health patterns within the US population consistently show that non-Hispanic Blacks have higher all-cause mortality rates, lower life expectancies, and worse mental health than non-Hispanic Whites.[4,8–13] In fact, White–Black health disparities in life expectancies have widened since the 1980s, largely because of slow improvements in health status, especially heart disease, within the Black population.[4,8]

Previous research shows how race/ethnicity influences health variation through differential exposure to health risks; however, much of the research about racial/ethnic health disparities may have limited application because it is based largely on US Black–White comparisons. The association between race/ethnicity and health disparities needs to be placed in the *social context* of racial/ethnic hierarchies rather than simply described in terms of biological or genetic differences Also, the sociohistorical protocols for categorizing people into racial/ethnic categories differ from country to country, which means that racial/ethnic hierarchies are defined by time and place.[16–18] Hence, the health implications of race/ethnicity in the United States are presumably distinct from those in other countries, which places an obvious restriction on theories of racial/ethnic health variation based strictly on US Black–White differences. These theories may even have limited relevance in the US context: current research shows that non-Black Hispanics, who will displace Blacks as the largest US minority group by 2010, and other racial/ethnic minorities have health profiles that the predominant theories cannot explain.[10,19]

There are compelling arguments for a research agenda that disaggregates conventional racial/ethnic categories (or makes ethnically diverse comparisons) to uncover important distinctions in health risks and outcomes.[14,17,20] To help further this agenda, we compared 12 racial/ethnic groups on functional and self-reported health with a nationally representative sample (n=67 858). We also considered whether differential socioeconomic status (SES) and health risk behaviors—2 leading theories for racial/ethnic health variation—are valid explanations for any physical health disparities between racial/ethnic minorities and nonminorities. Finally, we examined how functional health compares with self-reported health to determine whether race/ethnicity influences perceived health status.

BACKGROUND

The most salient health differences between US racial/ethnic minorities and nonminorities encompass all-cause mortality rates and the prevalence of chronic conditions, functional status and disabilities, health behaviors and attitudes, and differential quality of and access to health care services.[1,4,21,22] Among the US Black population, life expectancy rates are, perhaps, the definitive indicator of Black–White disparities in health status. In 1980, the life expectancy for Blacks was 68.1 years compared with 74.4 years for Whites. The life expectancy for Blacks improved to 69.1 years by 1990, but the rate of improvement was much higher among Whites, and the Black–White life expectancy gap actually increased from 6.3 to 7 years between 1980 and 1990.[1] This "excess" mortality within the Black population is associated with a higher prevalence of cardiovascular disorders, cancers, cirrhosis, and diabetes.[8]

The most commonly invoked explanations for racial/ethnic health variation are the genetic perspective, the socioeconomic perspective, and the cultural/behavioral perspective.[1,23] The genetic approach to racial/ethnic health differences is problematic[17,24–26] and has lost credibility because the evidence shows that genetic variation is often greater within racial/ethnic groups than between them.[27] For example, the US Black population is so diverse that some members may be genetically closer to Whites than to other Blacks.[28] However, while racial/ethnic classifications have no objective foundation, these racial/ethnic categories are sociologically relevant because they represent how people are both ranked and treated within societies. These categories provide crucial insights into social stratification, but they do not describe

genetic distinctions and how these distinctions influence vulnerability to illness.[15]

The dominant explanation for racial/ethnic health variation focuses on differences in SES.[4,12,29,30] Previous research has emphasized 2 dimensions of SES that precipitate or contribute to health disparities. First, low income and abbreviated educational attainment are associated with limited access to and usage of health care services. Common disparities within low SES households include untimely or unresponsive health care, underutilization of preventive health services, and incomplete testing for illnesses.[4] Second, there is a strong association between SES and exposure to environmental health risks. For example, the poor often live or work in conditions where the air quality and water quality are substandard, residential dwellings are crowed and dilapidated, amenities and infrastructure are deficient, and crime rates are high.[12,31–33]

The US Black population is substantially overrepresented among the poor and has a poverty rate 3 times higher than the White population.[4] Because of the consistent association between SES and health outcomes, the general socioeconomic disadvantages experienced by the Black population represent multiple health risks. The SES perspective is particularly plausible because Black–White health disparities attenuate or even disappear when individual- and community-level SES factors are held equal.[30,34] In Canada, non-Whites also face socioeconomic disadvantages and discrimination.[35,36] Therefore, we examined whether SES explains racial/ethnic health patterns in Canadian society, especially differences between racial/ethnic minorities and nonminorities.

The cross-national relevance of the SES model is somewhat questionable because of US–Canada differences in health care access and benefits. Unlike the United States, where both race/ethnicity and SES are important factors in health insurance coverage,[37] the Canadian system is guided by standards that guarantee universal and comprehensive health care coverage.[38,39] The strong national commitment to the public, nonprofit administration of health care provides a cost-effective, high-quality, universal health care system. Therefore, in Canada, the race/ethnicity–SES–health association may be a weak explanation for racial/ethnic health disparities because all Canadians have equal health care coverage and benefits.

Health outcomes are often a function of personal attitudes and behaviors. Approximately half of all US deaths are related to unhealthy practices, including obesity, infrequent exercise, smoking, and alcohol abuse.[4] The cultural/behavioral perspective is grounded by evidence that shows racial/ethnic health disparities parallel differences in health behaviors. For example, Black–White variance in obesity and physical inactivity are strongly associated with racial/ethnic differences in the prevalence of cardiovascular disease, the leading cause of death in the United States.[40] An uneven distribution of obesity also is a core factor behind the elevated risk for numerous chronic conditions (e.g., hypertension, diabetes, cancer, pain, functional status) and comorbidity within the US Black population.[41,42] In addition, previous research has shown that there are racial/ethnic patterns in the consumption of tobacco products and the incidence of alcohol problems.[43,44]

On the one hand, certain racial/ethnic groups are disproportionately exposed to circumstances that increase the likelihood of having poor health behaviors. A relatively high number of US Blacks live in neighborhoods where there are no supermarkets that offer a wide variety of nutritious foods at reasonable prices.[45] This disparity may explain racial/ethnic dietary patterns and, consequently, differences in obesity and obesity-related health problems. Furthermore, tobacco and alcohol advertisers specifically target poor and minority groups, and more liquor stores are located in predominately Black rather than predominately White neighborhoods.[46,47] These circumstances explain racial/ethnic differences in the consumption of health-damaging products. On the other hand, some racial/ethnic minorities, especially recent immigrants, have health behaviors (e.g., good diets, not smoking) that confer a health advantage.[19,48] Hence, our analysis examined whether health risk behaviors structure racial/ethnic differences in health outcomes.

Finally, we examined how functional health compares with self-reported health within each selected racial/ethnic category. As a more subjective measure of health status, self-reported health may be inconsistent with other measures of health. For example, disparities between self-reported and functional health may emerge through racial/ethnic differences in health reporting. Research shows that Blacks are often unwilling to reveal complete personal health details because they distrust health professionals.[49] Moreover, how functional health is perceived is an important dimension of overall health status. How racial/ethnic groups perceive specific functional health problems may differ and thus lead to incongruence between functional and self-reported health within racial/ethnic groups.

METHODS

Sample

We used data from the National Population Health Survey (NPHS), Cycle 2, which was conducted by Statistics Canada in 1996 and 1997. The survey included a sample of 81 804 Canadians from all provinces, except individuals who lived in Indian Reserves, Canadian Forces bases, institutions, and some remote areas. The data were collected primarily through telephone interviews, each of which took about 1 hour; face-to-face interviews were conducted when the respondent did not have a telephone or upon request. In addition to the 2 official languages, English and French, 9 other languages were used in the interviews. After removing cases in which the information on key variables was missing, our study sample included 67 858 men and women aged 18 years and older.

Measures

We examined and measured 2 dimensions of health status: functional and self-reported. Functional health was measured with a generic health status index that included 8 dimensions of functional health: vision, hearing, speech, mobility, dexterity, feelings, cognition, and pain. The index ranged from 0 to 1, with 1 representing perfect health ($\bar{X}$=.91, SD=.12, skewness=−2.72). We used the arcsine–square root transformation in the regression analysis to avoid the out-of-range problem.[50] Self-reported health was measured with a numerical scale that ranged from 1

TABLE 1—Percentage Distribution of Race/Ethnicity: Canada, 1996–1997

Race/Ethnicity	% (No.)
East and Southeast Asian	1.39 (600)
Chinese	2.50 (791)
South Asian	2.05 (765)
Aboriginal	0.75 (923)
Black	1.71 (759)
Arabic and West Asian	0.64 (300)
Latin American	0.34 (156)
Jewish	0.49 (187)
French	17.49 (5 394)
English	10.86 (9 214)
Mixed racial groups	0.86 (626)
Other Whites	60.92 (48 143)
Total	100% (67 858)

Note. Weighted percentages; unweighted numbers.

(poor) to 5 (excellent) ($\bar{X}$=3.75, SD=.95, skewness=–.55).

Our independent variable was race/ethnicity, which was derived from responses to 2 survey questions: "How would you best describe your race or color?" and "To which ethnic or cultural group(s) did your ancestors belong? (For example: French, Scottish, Chinese.)" We used the responses from the first question to identify 8 visible minority groups. Responses to the second question were used to disaggregate non-Hispanic White respondents into 4 groups: English, French, Jewish, and other Whites. Table 1 shows the racial/ethnic categories and their percentage distributions among the target population. Some of these groups obviously include peoples from distinct cultural, racial, and national backgrounds. Our racial/ethnic selections were "taxonomic categories" and did not necessarily represent communities that had "substantial relations of connection."[51] In the regression analyses, race/ethnicity was "effect" coded so that the sum of the coefficients equaled 0, because the reference category would otherwise have been arbitrary in the "dummy" coding.

Statistics Canada and the US Census Bureau use similar definitions to identify the total Black and White populations, but Statistics Canada uses more refined ethnic categories than the US Census Bureau does. For example, Statistics Canada divides Asian and Pacific Islanders into their constituent ethnic groups (e.g., Chinese, Japanese, South Asians) to transform a heterogeneous "racial" category into a diverse ethnocultural taxonomy. Blacks and Hispanics (Latin Americans) remain homogeneous groupings by Statistics Canada definitions, but the NPHS permits specific racial/ethnic identification for any respondent who is dissatisfied with these general categories.

We measured 3 variables of SES: family income, educational attainment, and low income. Family income was an ordinal variable with 11 levels that ranged from no reported income to Can$80 000 or more. The mean family income (7.51) was equivalent to Can$40 000 per year. Education was measured on an ordinal scale that ranged from no formal education to graduate school. The mean education level (6.57) was some vocational training or some community college. To measure low income, we used the NPHS income adequacy scale, which is based on income relative to household size.[52] The low-income cutoffs were less than Can$10 000 for households that had 1 to 4 persons and less than Can$15 000 for households that had 5 or more persons. Table 2 shows the definitions and descriptive statistics for these and all other control variables.

We measured 4 health risk factors: physical inactivity, obesity, alcohol use, and tobacco use. All were identified with a dummy variable. In the NPHS, respondents who had an estimated energy expenditure level of less than 1.5 kcal/kg per week were classified as physically inactive, and respondents who had a body mass index score higher than 27 were

TABLE 2—Definitions and Descriptive Statistics for Variables Used in the Multivariate Analyses: Canada, 1996–1997

	Definition and Code	Mean or % (SD)
	Health indicators	
Functional health	Generic health index (range = 0–1)	0.91 (0.12)
Self-reported health status	Likert scale in 5 levels (1 = poor, –5 = excellent)	3.75 (0.95)
	Socioeconomic status	
Family income	Family income in 11 levels (1 = none, –11 = ≥ $80 000	7.51 (2.03)
Education	Educational attainment in 12 levels (1 = no education, –12 = master's degree or above)	6.57 (3.03)
Low income	Income was inadequate (1 = yes, 0 = no)	13.1%
	Health risk factors	
Physically inactive	Dummy variable (1 = respondents with an estimated energy expenditure level < 1.5, 0 = otherwise)[a]	62.8%
Overweight	Dummy variable (1 = yes, 0 = no)	36.6%
Alcohol problem	Dummy variable (1 = respondents with a daily alcohol consumption > 5 drinks, 0 = otherwise)	24.8%
Smoking	Dummy variable (1 = regular/occasional smoker, 0 = otherwise)	28.7%
	Demographic variables	
Female	Dummy variable (1 = female, 0 = male)	51.1%
Age	Age in years	44.38 (16.39)
Age^2	Quadratic term of age	2259.5 (1627.72)
Marital status		
Separated/divorced	Dummy variable (1 = yes, 0 = no)	7.6%
Widowed	Dummy variable (1 = yes, 0 = no)	5.9%
Never married	Dummy variable (1 = yes, 0 = no)	23.1%
Married/cohabiting	Reference category	63.5%
Immigrant	Dummy variable (1 = yes, 0 = no)	19.5%
Rural residence	Dummy variable (1 = yes, 0 = no)	17.1%
N		67 858

Note. Weighted means or percentages; unweighted numbers.

TABLE 3—Unstandardized Coefficients From Regressions of Functional Health on Race/Ethnicity and Selected Independent Variables: Canada, 1996–1997

Independent Variable	Model 1	Model 2	Model 3
Race/ethnicity[a]			
East and Southeast Asian	0.021**	0.018*	0.017*
Chinese	–0.005	–0.008	–0.007
South Asian	0.019**	0.018**	0.020**
Aboriginal	–0.044***	–0.028***	–0.022***
Black	0.022**	0.025***	0.021**
Arabic and West Asian	–0.024*	–0.022*	–0.015
Latin American	0.024	0.031*	0.030*
Jewish	–0.024	–0.038**	–0.038**
French	–0.001	0.000	–0.004
English	0.021***	0.015***	0.012***
Mixed racial groups	–0.022**	–0.020**	–0.020**
Other Whites[b]	0.012	0.008	0.006
Family income	. . .	0.008***	0.007***
Education	. . .	0.003***	0.001***
Low income	. . .	–0.037***	–0.036***
Physically inactive	. . .	. . .	–0.036***
Overweight	. . .	. . .	–0.023***
Alcohol problem	. . .	. . .	–0.022***
Smoking	. . .	. . .	–0.029***
Female	–0.025***	–0.022***	–0.019***
Age	–0.003***	–0.004***	–0.003***
Age^2 (×1000)	–0.016***	–0.002	–0.011***
Marital status			
Separated/divorced	–0.049***	–0.030***	–0.028***
Widowed	–0.014***	0.002	0.004
Never married	–0.035***	–0.023***	–0.025***
Married/cohabiting[c]			
Rural residence	0.005*	0.009***	0.010***
Immigrant	0.005	0.005*	0.003
Intercept	1.527***	1.464***	1.504***
R^2	0.146	0.162	0.176
ΔR^2	. . .	0.016***	0.014***
F	. . .	438	293
df	. . .	3	4

[a]Race/ethnicity is "effect" coded such that $\sum b_i = 0$.
[b]$-\sum b_i$.
[c]Reference group.
*P < .05; ** P < .01; *** P < .001 (2-tailed test).

considered overweight. An alcohol problem was defined as having a daily alcohol intake of more than 5 drinks, and we identified regular/occasional tobacco smokers (any amount) with a dichotomous variable.

We included several demographic variables. Females, who composed 51.1% of the target population, were identified with a dummy variable. Age was measured in years; the average age of the target population was about 44 years (SD=16.4). The sample distribution of age was slightly positively skewed (skewness=.44). We included a quadratic term of age because the relationship between age and health may be nonlinear. Marital status was measured in 4 levels: separated and divorced (7.6%), widowed (5.9%), never married (23.1%), and married/cohabitate (63.5%). Finally, foreign-born respondents and rural residents—19.5% and 17.7% of the target population, respectively—were identified with a dummy variable.

RESULTS

Table 3 shows the unstandardized coefficients from the ordinary least squares regressions of functional health on race/ethnicity. As model 1 shows, compared with the study sample average, East and Southeast Asian, South Asian, Black, and English Canadians had consistent functional health. Aboriginal, Arabic and West Asian, and mixed-race Canadians had significantly worse functional health than the sample average. All other racial/ethnic groups had functional health that was not significantly different from the sample average. Hence, these initial findings show that functional health varied across racial/ethnic groups.

Our results were mostly consistent across all models, which means that the socioeconomic and cultural/behavioral perspectives are not good explanations for racial/ethnic functional health variation in Canada. However, when health risk behaviors were held equal, the health disadvantage experienced by Arabic and West Asian Canadians disappeared. Latin American Canadians appeared healthier than average when SES was controlled; Jewish Canadians appeared unhealthier when SES was controlled.

Because self-reported health is an ordinal variable, we used cumulative logit regression models in the analysis.[53] Table 4 shows the unstandardized coefficients from cumulative logit regressions of self-reported health on race/ethnicity. Black, French, and English Canadians had self-reported health that was higher than the study sample average, and Aboriginal Canadians had lower-than-average self-reported health. Again, the results were consistent across all models, which provides little support for the socioeconomic and cultural/behavioral perspectives. However, East and Southeast Asian Canadians had lower-than-average self-reported

TABLE 4—Unstandardized Coefficients from Cumulative Logit Regressions of Self–Reported Health on Race/Ethnicity and Selected Independent Variables: Canada, 1996–1997

Independent Variable	Model 1	Model 2	Model 3
Race/ethnicity[a]			
East and Southeast Asian	–0.073	–0.125	–0.150*
Chinese	–0.006	–0.062	–0.068
South Asian	0.012	0.002	0.012
Aboriginal	–0.557***	–0.337***	–0.245***
Black	0.239***	0.284***	0.229***
Arabic and West Asian	–0.162	–0.154	–0.059
Latin American	–0.027	0.042	0.037
Jewish	0.076	–0.139	–0.138
French	0.118***	0.166***	0.113**
English	0.339***	0.293***	0.264***
Mixed racial groups	–0.130	–0.116	–0.121
Other Whites[b]	0.170	0.146	0.125
Family income	. . .	0.099***	0.088***
Education	. . .	0.080***	0.065***
Low income	. . .	–0.230***	–0.213***
Physically inactive	. . .	. . .	–0.465***
Overweight	. . .	. . .	–0.449***
Alcohol problem	. . .	. . .	–0.321***
Smoking	. . .	. . .	–0.403***
Female	–0.020	0.007	0.058***
Age	–0.019***	–0.036***	–0.020***
Age^2 ($\times$1000)	–0.110***	0.102***	–0.050*
Marital status			
Separated/divorced	–0.284***	–0.096***	–0.076**
Widowed	–0.055	0.119***	0.145***
Never married	–0.194***	–0.078***	–0.111***
Married/cohabiting[c]			
Rural residence	–0.058***	0.021	0.033
Immigrant	0.024	0.019	–0.009
Intercept 1	–0.201**	–1.284***	–0.841***
Intercept 2	1.543***	0.509***	1.007***
Intercept 3	3.196***	2.206***	2.742***
Intercept 4	4.722***	3.753***	4.306***
Model (χ^2)	5565	8338	11150
df	19	22	26
$\Delta\chi^2$	. . .	2774***	2811***
df	. . .	3	4

[a]Race/ethnicity is "effect" coded such that $\sum b_i = 0$.
[b]$-\sum b_i$.
[c]Reference group.
* $P < .05$; ** $P < .01$; *** $P < .001$ (2-tailed test).

health when risk behavior differentials were held equal.

There was some contrast between functional health and self-reported health within certain racial/ethnic groups: East and Southeast Asian Canadians had better functional health but worse self-reported health, South Asian and Latin American Canadians had better functional health but average self-reported health, Jewish and mixed-race Canadians had worse functional health but average self-reported health, and French Canadians had average functional health but better self-reported health. All other racial/ethnic groups had nondivergent functional and self-reported health statuses.

All other variables affected functional and self-reported health in manners that are consistent with well-established trends. However, we should note that women had better self-reported health than men, despite having worse functional health. This contrast contradicts established trends in gender-based health reporting.[49]

DISCUSSION

Functional and self-reported health statuses are crucial determinants of quality of life and the demand for informal and formal health care resources. Our analysis focused on whether these dimensions of health differ by race/ethnicity, and we paid special attention to any variance between racial/ethnic minorities and nonminorities. Previous studies have reported findings that show racial/ethnic health disparities.[2,5,21] We reject genetic explanations for these disparities and instead argue that racial/ethnic health variation is embedded in socioeconomic or behavioral differentials.[3,4,12] However, because most previous research has focused on US Black–White differences, the predominant conceptual models for racial/ethnic health variation may have limited applicability. We have contributed to the literature by examining these models within a large racially/ethnically diverse study sample.

Our initial analysis showed racial/ethnic variation in functional and self-reported health. The pattern of variance did not show that racial/ethnic minority status was a general health disadvantage: some racial/ethnic groups indeed had worse-than-average health, but others had better-than-average health. In contrast to US findings, the Canadian Black population had superior functional and self-reported health, regardless of any socioeconomic or behavioral differences. Indeed, we observed that 22% of Black Canadians fell within the lowest income quartile compared with 11% of English Canadians and 12% of other White Canadians (data not shown). Black Canadians also reported lower family incomes than the majority of the population,

even though they had somewhat more education.

Because of the previous evidence, our subsequent models examined whether socioeconomic or behavioral differences explain racial/ethnic health differences in Canada. For functional health, little variance existed between the baseline model and those that examined SES and health risk behaviors. In only 2 instances did SES have a mediating effect: Latin American Canadians appeared healthier and Jewish Canadians appeared unhealthier when SES was controlled. Only Arabic and West Asian Canadians' functional health differed (improved) when health behaviors were controlled. Similarly, self-reported health was mostly consistent across all models, with one exception: East and Southeast Asian Canadians' health appeared worse when health behaviors were controlled.

Our findings offer little support for the socioeconomic and behavioral perspectives on racial/ethnic health variation. These perspectives do not explain health variance between racial/ethnic minorities and nonminorities, and our findings seriously question whether models that are based on US Black–White differences are generalizable. Unlike the United States, health care access in Canada is not strongly determined by SES, which may explain why the socioeconomic perspective fails to explain racial/ethnic health variance in Canada. Racial/ethnic behavioral differences are largely determined by residential segmentation and social position.[31,45–47] Hence, differences between Canada and the United States in these respects may explain why the behavioral perspective fails to explain racial/ethnic health variance in Canada.

We examined whether there were any discrepancies between functional and self-reported health within each racial/ethnic group. Our results show the subjective nature of self-reported health, and the relationship between functional health and self-reported health is not necessarily straightforward. Because it is a subjective measure, self-reported health might not accurately reflect functional status. Perceptions of objective health problems may be culturally specific. For example, among a racial/ethnic group that values independence, limited functional status may result in relatively poor self-reported health ratings because such status increases dependence on others. Conversely, a similar health limitation may have negligible implications for self-reported health among members of racial/ethnic groups that stress interdependence.

Conclusions

While the socioeconomic and behavioral perspectives fail to explain racial/ethnic health patterns in Canada, this does not mean that SES and health behaviors are unimportant health indicators. However, we suggest that structural and policy differences between Canada and the United States may explain why these conceptual models are ineffective for explaining racial/ethnic health variation in Canada. SES may have weaker health implications in Canada because of the universal health care system. In addition to treatment of serious health problems, universal health care involves regular and responsive care by a family doctor. Good access to a family doctor is important for preventive medicine and treating health problems before health crises occur. Therefore, albeit rather indirectly, our results specify the important role the state can have in health outcomes. ■

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Z. Wu originated the article idea, developed the conceptual framework, and conducted the statistical analysis. C.M. Schimmele drafted the article. Both authors contributed to revisions.

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